

IN THE CLAIMS

Pursuant to 37 CFR §121(c), the claim listing, including the text of the claims, will serve to replace all prior versions of the claims, in the application.

Please cancel claims 5, 6, 17 and 19 without prejudice or disclaimer, and amend claims 1, 7 thru 11, 13, 18, 20 thru 23, 26, 27 and 29 as follows:

1           1. (Currently Amended) An apparatus for controlling load balance of  
2 multi-access points in a wireless local area network system, the apparatus comprising:

3           a plurality of wireless local area network terminals having wireless local area  
4 network interfaces and receiving a wireless local area network service;

5           a plurality of access points for providing the wireless local area network service to  
6 the wireless local area network terminals, for periodically transmitting load state  
7 information, and for suppressing an increase of load when a load suppressing signal is  
8 received; and

9           a management system for comparatively evaluating load states of each access  
10 point by receiving the load state information from the access points, and for transmitting  
11 a load increase suppressing signal to access points whose load values are more than a  
12 threshold value, when there are access points whose load values are more than the  
13 threshold value and other access points around the access points whose load values are  
14 more than the threshold value are in an idle state;

15           wherein, when transmitting an authentication failure message according to an  
16 authentication request of the wireless local area network terminals,

17           the management system transmits information on other neighboring access points  
18 in the idle state to the access points whose load value exceed the threshold value,

19           the access points transmit the information on the other neighboring access points  
20 in the idle state to the wireless local area network terminals, and

21           the wireless local area network terminals receive the information on the other  
22           neighboring access points in the idle state from the access points and attempt access to  
23           the other access points in the idle state.

1           2. (Previously Presented) The apparatus of claim 1, wherein the load state  
2           information transmitted to the management system from the wireless local area network  
3           access points includes a number of accessed wireless local area network terminals, a  
4           number of wireless local area network terminals recently generating data traffic, a  
5           number of data frames, and a data frame length.

1           3. (Original) The apparatus of claim 1, wherein the load increase suppressing  
2           operation, performed by the wireless local area network access points, transmits an  
3           authentication failure message according to an authentication request of the wireless  
4           local area network terminals attempting the access.

1           4. (Original) The apparatus of claim 1, wherein the load increase suppressing  
2           operation, performed by the wireless local area network access points, deletes network  
3           node addresses of the wireless local area network terminals by basic service set tables and  
4           intercepts the access of the wireless local area network terminals, when the wireless local  
5           area network terminals, which do not continuously generate data traffic and keep  
6           accessing, generate the data traffic.

Claims 5-6. (Canceled)

1           7. (Currently Amended) The apparatus of claim 1, wherein when transmitting  
2     [[an]] the authentication failure message according to [[an]] the authentication request of  
3     the wireless local area network terminals, the management system transmits information  
4     on [[the]] access-attempting wireless local area network terminals to other idle access  
5     points, and the idle access points attempt access to the wireless local area network  
6     terminals.

1           8. (Currently Amended) The apparatus of claim 3, wherein when transmitting the  
2     authentication failure message according to the authentication request of the wireless  
3     local area network terminals, the management system transmits information on [[the]]  
4     access-attempting wireless local area network terminals to [[the]] other idle access  
5     points, and the idle access points attempt access to the wireless local area network  
6     terminals.

1           9. (Currently Amended) The apparatus of claim 1, wherein the management  
2     system intercepts access of the wireless local area terminals by deleting network node  
3     addresses of the wireless local network terminals, ~~and wherein, when intercepting the~~  
4     ~~access of the wireless local area network terminals by deleting the network node~~  
5     ~~addresses of the wireless local area network terminals, the management system transmits~~  
6     ~~information on other neighboring access points in the idle state to the access points~~  
7     ~~whose load values exceed the threshold value, the access points transmit the information~~  
8     ~~on the other neighboring access points in the idle state to the wireless local area network~~  
9     ~~terminals, and the wireless local area network terminals receive the information on other~~  
10    ~~idle access points from the access points and attempt access to the other idle access~~  
11    ~~points.~~

1           10. (Currently Amended) The apparatus of claim 4, wherein when intercepting  
2 the access of the wireless local area network terminals by deleting the network node  
3 addresses of the wireless local area network terminals, the management system transmits  
4 [[the]] information on other neighboring access points in the idle state to the access  
5 points whose load values exceed the threshold value, the access points transmit the  
6 information on the other neighboring access points in the idle state to the wireless local  
7 area network terminals, and the wireless local area network terminals receive the  
8 information on [[the]] other idle access points from the access points and attempt access  
9 to the other idle access points.

1           11. (Currently Amended) The apparatus of claim [[1]] 9, wherein ~~the~~  
2 ~~management system intercepts access of the wireless local area terminals by deleting~~  
3 ~~network node addresses of the wireless local network terminals, and wherein, when~~  
4 intercepting the access of the wireless local area network terminals by deleting the  
5 network node addresses of the wireless local area network terminals, the management  
6 system transmits information on access-attempting wireless local area network terminals  
7 to other idle access points, and the idle access points attempt access to the wireless local  
8 area network terminals.

1           12. (Previously Presented) The apparatus of claim 4, wherein when intercepting  
2 the access of the wireless local area network terminals by deleting the network node  
3 addresses of the wireless local area network terminals, the management system transmits  
4 information on access-attempting wireless local area network terminals to other idle  
5 access points, and the idle access points attempt access to the wireless local area network  
6 terminals.

1           13. (Currently Amended) A method of controlling load balance of multi-access  
2 points in a wireless local area network system including a plurality of wireless local area  
3 network terminals and a plurality of access points, the method comprising the steps of:

4           periodically monitoring load states of the access points;

5           transmitting a load increase suppressing signal to access points whose load values  
6 exceed a threshold value[,] when there are the access points whose load values exceed  
7 the threshold value, and there are idle access points around the access points while  
8 monitoring the load states of the access points; and

9           suppressing an increase of load by transmitting an authentication response failure  
10 message for access-attempting wireless local area network terminals in corresponding  
11 access points according to the transmitted load increase suppressing signal;

12           wherein the step of suppressing the increase of load comprises the sub-steps of:

13           transmitting information on neighboring idle access points to the access points  
14 whose load values exceed the threshold value;

15           transmitting the information on the neighboring idle access points to the wireless  
16 local area network terminals by the access points; and

17           attempting access to the neighboring idle access points, and setting the access by  
18 the wireless local area network terminals.

1           14. (Previously Presented) The method of claim 13, wherein load state  
2 information includes a number of accessed wireless local area network terminals, a  
3 number of wireless local area network terminals recently generating data traffic, a  
4 number of data frames, and a data frame length.

1           15. (Previously Presented) The method of claim 13, wherein the step of  
2 periodically monitoring the load states of the access points comprises the sub-steps of:  
3           periodically receiving load state information from the access points;

4 detecting timed changing values of load values by using the load state information  
5 periodically received from the access points;

6 transmitting a signal for requesting to transmit the load state information to access  
7 points whose timed changing values are more than a predetermined value, when the timed  
8 changing values of detected load values are more than the predetermined value;

9 generating load state information messages, including the load state information,  
10 by the access points receiving the signal for requesting to transmit the load state  
11 information; and

12 monitoring load states of the access points according to the load state information  
13 messages generated from the access points.

1 16. (Previously Presented) The method of claim 13, wherein the step of  
2 transmitting the load increase suppressing signal comprises the sub-steps of:

3 (a) determining whether there are access points whose load values exceed the  
4 threshold value based on load state information received from multi-access points;

5 (b) repeating the step of periodically monitoring the load states of the access  
6 points when it is determined, in sub-step (a), that there are no access points whose load  
7 values exceed the threshold value;

8 (c) determining whether there are neighboring idle access points when it is  
9 determined, in sub-step (a), that there are access points whose load values exceed the  
10 threshold value;

11 (d) repeating the step of periodically monitoring the load states of the access  
12 points when it is determined, in sub-step (c), that there are no neighboring idle access  
13 points; and

14 (e) transmitting the load increase suppressing signal to the access points whose  
15 load values exceed the threshold value when it is determined, in sub-step (c), that there  
16 are neighboring idle access points.

Claim 17. (Canceled)

1           18. (Currently Amended) The method of claim 13, wherein the step of  
2     suppressing the increase of the load ~~in the corresponding access points~~ comprises the sub-  
3     steps of deleting network node addresses of the wireless local area network terminals  
4     from basic service set tables, and intercepting access of the wireless local area network  
5     terminals[[,]] when the wireless local area network terminals, which do not continuously  
6     generate data traffic and keep accessing according to a control signal for suppressing the  
7     increase of the load, generate data traffic.

Claim 19. (Canceled)

1           20. (Currently Amended) The method of claim [[17]] 13, wherein the ~~sub-step of~~  
2     transmitting of the authentication response failure message for the access-attempting  
3     wireless local area network terminals comprises the sub-steps of:

4           transmitting information on the access-attempting wireless local area network  
5     terminals to neighboring idle access points; and

6           attempting access to the wireless local area network terminals, and setting the  
7     access by the neighboring idle access points.

1           21. (Currently Amended) ~~[[The]]~~ A method of claim 18, controlling load balance  
2     of multi-access points in a wireless local area network system including a plurality of  
3     wireless local area network terminals and a plurality of access points, the method

4 comprising the steps of:

5 periodically monitoring load states of the access points;

6 transmitting a load increase suppressing signal to access points whose load values  
7 exceed a threshold value when there are the access points whose load values exceed the  
8 threshold value and there are idle access points around the access points while monitoring  
9 the load states of the access points; and

10 suppressing an increase of load by deleting network node addresses of the wireless  
11 local area network terminals from basic service set tables and intercepting access of the  
12 wireless local area network terminals when the wireless local area network terminals,  
13 which do not continuously generate data traffic and keep accessing according to a control  
14 signal for suppressing the increase of the load, generate data traffic in corresponding  
15 access points according to the transmitted load increase suppressing signal;

16 wherein the ~~sub-step~~ step of ~~intercepting the access of the wireless local area~~  
17 ~~network terminals~~ suppressing the increase of load comprises the sub-steps of:

18 transmitting information on neighboring idle access points to the access points  
19 whose load values exceed the threshold value;

20 transmitting the information on the neighboring idle access points to the wireless  
21 local area network terminals by the access points; and

22 attempting access to the neighboring idle access points, and setting the access by  
23 the wireless local area network terminals.

1 22. (Currently Amended) The method of claim ~~[[18]]~~ 21, wherein the ~~sub-step~~  
2 ~~step~~ of ~~intercepting the access of the wireless local area network terminals~~ suppressing  
3 the increase of load further comprises the sub-steps of:

4 transmitting information on the wireless local area network terminals generating  
5 the data traffic to the idle access points around the access points whose load values  
6 exceed the threshold value; and



7 attempting access to the wireless local area network terminals, and setting the  
8 access by the idle access points.

1 23. (Currently Amended) An apparatus, comprising:

2 a plurality of wireless network terminals having wireless network interfaces and  
3 receiving a wireless network service;

4 a plurality of access points for providing the wireless network service to the  
5 wireless network terminals, for periodically transmitting load state information, and for  
6 suppressing an increase of load when a load suppressing signal is received; and

7 an evaluation unit for comparatively evaluating load states of each access point by  
8 receiving the load state information from the access points, and for transmitting a load  
9 increase suppressing signal to access points whose load values are more than a threshold  
10 value, when there are access points whose load values are more than the threshold value,  
11 and when other access points around the access points whose load values are more than  
12 the threshold value are in an idle state;

13 wherein, when transmitting an authentication failure message according to an  
14 authentication request of the wireless local area network terminals,

15 the evaluation unit transmits information on other neighboring access points in the  
16 idle state to the access points whose load value exceed the threshold value,

17 the access points transmit the information on the other neighboring access points  
18 in the idle state to the wireless local area network terminals, and

19 the wireless local area network terminals receive the information on the other  
20 neighboring access points in the idle state from the access points and attempt access to  
21 the other access points in the idle state.

1 24. (Previously Presented) The apparatus of claim 23, wherein the load state  
2 information received by the evaluation unit from the access points includes a number of

3 accessed wireless network terminals, a number of wireless network terminals recently  
4 generating data traffic, a number of data frames, and a data frame length.

1 25. (Previously Presented) The apparatus of claim 24, wherein a load increase  
2 suppressing operation, performed by the wireless network access points, includes  
3 transmitting an authentication failure message according to an authentication request of  
4 wireless network terminals attempting the access.

1 26. (Currently Amended) The apparatus of claim 25, wherein the load increase  
2 suppressing operation, performed by the wireless network access points, includes  
3 deleting network node addresses of the wireless network terminals by basic service set  
4 tables and intercepting the access of the wireless network terminals[[,]] when wireless  
5 network terminals, which do not continuously generate data traffic and which keep  
6 accessing, generate the data traffic.

1 27. (Currently Amended) A computer-readable medium having computer-  
2 executable instructions for performing a method of controlling a load balance of  
3 multi-access points in a wireless local area network system including a plurality of  
4 wireless local area network terminals and a plurality of access points, the method  
5 comprising the steps of:

6 periodically monitoring load states of the access points;

7 transmitting a load increase suppressing signal to access points whose load values  
8 exceed a threshold value[[,]] when there are the access points whose load values exceed  
9 the threshold value, and when there are idle access points around the access points while  
10 monitoring the load states of the access points; and

11 suppressing an increase of load in corresponding access points according to the  
12 transmitted load increase suppressing signal;

13        wherein the step of suppressing the increase of load comprises the sub-steps of:  
14        transmitting information on neighboring idle access points to the access points  
15        whose load values exceed the threshold value;  
16        transmitting the information on the neighboring idle access points to the wireless  
17        local area network terminals by the access points; and  
18        attempting access to the neighboring idle access points, and setting the access by  
19        the wireless local area network terminals.

1            28. (Previously Presented) The computer-readable medium having computer-  
2        executable instructions for performing the method of claim 27, wherein load state  
3        information includes a number of accessed wireless local area network terminals, a  
4        number of wireless local area network terminals at a certain time generating data traffic, a  
5        number of data frames, and a data frame length.

1            29. (Currently Amended) A computer-readable medium ~~having stored thereon a~~  
2        ~~data structure, comprising~~ encoded with a computer program comprising instructions for  
3        carrying out the steps of:

4            ~~a first field containing data representing~~ periodically monitoring load states of  
5        access points;

6            ~~a second field containing data representing~~ transmitting a load increase  
7        suppressing signal to access points whose load values exceed a threshold value[[,]] when  
8        there are the access points whose load values exceed the threshold value, and when there  
9        are idle access points around the access points while monitoring the load states of the  
10       access points, wherein the ~~second field of~~ transmitting of the load increase suppressing  
11       signal comprises ~~a first sub-field containing data representing~~ deciding whether there are  
12       access points whose load values exceed the threshold value based on the load state  
13       information received from the multi-access points, ~~a second sub-field containing data~~

14 ~~representing repeating from the first field of~~ periodically monitoring load states of the  
15 access points when there are no access points whose load values exceed the threshold  
16 value, ~~a third sub-field containing data representing~~ deciding whether there are  
17 neighboring idle access points when there are access points whose load values exceed the  
18 threshold value, and ~~a fourth sub-field containing data representing repeating from the~~  
19 ~~first field of~~ periodically monitoring load states of the access points when there are no  
20 neighboring idle access points;

21 ~~a third field containing data representing~~ transmitting the load increase  
22 suppressing signal to the access points whose load values exceed the threshold value  
23 when there are neighboring idle access points; and

24 ~~a fourth field containing data representing~~ suppressing an increase of load in  
25 corresponding access points according to the transmitted load increase suppressing  
26 signal;

27 wherein the step of suppressing the increase of load comprises the sub-steps of:  
28 transmitting information on neighboring idle access points to the access points  
29 whose load values exceed the threshold value;

30 transmitting the information on the neighboring idle access points to the wireless  
31 local area network terminals by the access points; and

32 attempting access to the neighboring idle access points, and setting the access by  
33 the wireless local area network terminals.